



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,091	09/25/2006	Shuichi Murakami	1018793-000277	8852

21839 7590 11/13/2008
BUCHANAN, INGERSOLL & ROONEY PC
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404

EXAMINER

LENIHAN, JEFFREY S

ART UNIT	PAPER NUMBER
----------	--------------

1796

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

11/13/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

Office Action Summary	Application No. 10/594,091	Applicant(s) MURAKAMI ET AL.	
	Examiner Jeffrey Lenihan	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/25/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range **of 50 to 150 words** (emphasis added). It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The instant claim recites a polar group-containing polymer composition having "a notched 23 °C IZOD value in a thickness of ¼ inch of 100 J/m or more." The examiner takes the position that it is unclear how said composition can be defined by a thickness, as a "polymer composition" does not have a shape. As such, it is also unclear how the IZOD value can be measured for a "polymer composition."

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-10 and 12-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Maruyama et al, US4707512.

8. The instant claims are directed towards a resin modifier obtained by reacting a polyolefin having a functional group reactive with carbodiimides and a carbodiimide group-containing compound, wherein the content of the carbodiimide group is from 1 to 200 mmol per 100 g of the resin modifier, and to a polar group-containing polymer

composition comprising said resin modifier. The examiner notes that claim 14 is written in product-by-process format, and is drawn to a composition prepared by mixing the above components.

9. Maruyama discloses a composition comprising 100 parts by weight of a polyester such as polyethylene terephthalate (Column 3, lines 3-10) (claims 8-10), 0.5-120 parts by weight of a modified ethylene/ α -olefin copolymer, and 0.01-5 parts by weight of a carbodiimide (Column 5, lines 19-23, Column 6, lines 23-27) (claims 1, 7, 12, 14). Said modified ethylene/ α -olefin copolymer may be modified via the grafting of an α , β -unsaturated carboxylic acid, such as maleic acid, or an anhydride thereof (Column 4, lines 27-34) (claims 5, 6, 12). Said carbodiimide may be a polycarbodiimide (Column 6, lines 12-23) (claim 4).

10. Example 13 of Maruyama discloses a composition comprising 100 parts by weight polybutylene terephthalate, 12 parts by weight of an ethylene/1-butene copolymer grafted with maleic anhydride (claims 6, 12) and tetrahydrofurfuryl methacrylate, and 0.5 parts by weight bis(dipropylphenyl)carbodiimide (claims 12, 14). Said composition has an IZOD strength measured according to ASTM D256 of 75 kg*cm/cm, or approximately 735.8 J/m (claim 12) (Table 3).

11. Maruyama does not recite the formation of a resin modifier/compatibilizer via the reaction of the graft-modified ethylene/1-butene copolymer and the carbodiimide compound (claims 1, 2, 7), the content of the carbodiimide group in the modifier (claims 1, 7, 12), that the polyolefin satisfies the formula $0.1 < Mn / (100 * f / M) < 6$ (claim 3), or the formation of an "island phase" having a specific diameter (claim 13).

Art Unit: 1796

12. Regarding the production of a resin modifier/compatibilizer wherein the content of carbodiimide groups is from 1-200 mmol/100 g of modifier, the examiner notes that applicant recites in ¶0015-0016 that a polyolefin grafted with maleic anhydride is suitable for use as the polyolefin having a carbodiimide-reactive functional group of the instant application. As noted above, Example 13 of Maruyama discloses a composition comprising 12 parts by weight of a polyolefin graft-modified with maleic anhydride and 0.5 parts by weight of a carbodiimide compound. The graft-modified polyolefin of Example 13 comprises 0.35% by weight maleic anhydride (Column 8, lines 47-63), and that the ratio of carbodiimide to modified polyolefin in the composition is 0.5/12, or 0.04 parts carbodiimide per 1 part polyolefin. The examiner notes that Examples 1-4 of the instant application recite the combination of a carbodiimide compound with a polyolefin comprising either 0.25% or 0.5 % by weight maleic anhydride, in which the ratio of carbodiimide to polyolefin is from 3.28/100, or 0.0328, to 6.54/100, or 0.0654. The examiner therefore takes the position that one of ordinary skill in the art would reasonably expect that, during the preparation of the composition of Example 13 of Maruyama, at least a fraction of the bis(dipropylphenyl)carbodiimide would react with the maleic anhydride-modified ethylene/1-butene copolymer to produce the modifier as described in the instant claims. As the modified polyolefin and carbodiimide of Maruyama are combined in a similar ratio to that used in the examples of the instant application, the examiner takes the position that one of ordinary skill would reasonably expect that the product of the reaction of the maleic anhydride-grafted polyolefin and the

Art Unit: 1796

bis(dipropylphenyl)carbodiimide would have the same properties as recited in the instant claims (claims 1, 2, 3, 12).

13. Regarding the formation of an "island phase" having a specific diameter, the examiner notes that applicant recites in ¶0071 that said island phase forms due to a reaction between the carbodiimide compound and the polar group-containing polymer, resulting in cross-linking. The examiner takes the position that one of ordinary skill would reasonably expect that a fraction of the (poly)carbodiimide in the composition of Maruyama would react with the polyethylene terephthalate, resulting in cross-linking of the polyester and the formation of the "island phase" having the same properties as recited in the instant claim (claim 13).

14. MPEP § 2112 recites that "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency under 35 U.S.C. 102, on *prima facie* obviousness under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same..." as that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980). As discussed in MPEP § 2113, once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). The burden is therefore shifted to the applicant to prove that the properties used to define

the modifier/composition of the instant claims would not be present in the polymer compositions disclosed by Maruyama.

15. Claims 1-10 and 12-14 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sakai et al, JP 2003268215, a machine translation of which has been included with this Office Action.

16. Sakai teaches a composition comprising 100 parts by weight of a thermoplastic polyester, 0.1-20 parts by weight of a modified polyolefin, and 0.01-10 parts by weight of a carbodiimide compound (claims 1, 7, 12, 14) (\P 0004). Said polyester resin recited to mainly comprise polyethylene terephthalate (claims 8-10) (\P 0004, 0005). Acid-modified polyolefins such as maleic anhydride modified polypropylene and copolymers of acrylic acid are recited as modified polyolefins included in the composition (claims 5, 6, 12) (\P 0006). Said carbodiimide may be either a mono-or polycarbodiimide (claim 4) (\P 0007). The composition may be manufactured via kneading in an extruder (\P 0012).

17. Sakai does not recite the formation of a resin modifier/compatibilizer via the reaction of the modified polyolefin and the carbodiimide compound (claims 1, 2), the content of the carbodiimide group in the modifier (claims 1, 7, 12), the IZOD value of the composition (claim 12), the diameter of an island phase (claim 13), or that the polyolefin satisfies the formula $0.1 < Mn / (100 * f / M) < 6$ (claim 3).

18. Regarding the formation of a resin modifier, the examiner notes that, as described above, the composition of Sakai comprises an acid-modified polyolefin and a (poly)carbodiimide compound. As the acid functional group is reactive towards

carbodiimide compounds, the examiner takes the position that one of ordinary skill in the art would reasonably expect that, upon mixing, at least a fraction of the acid-modified polyolefin and the (poly)carbodiimide compound would react with each other, resulting in a composition comprising the reaction product of an acid-modified polyolefin and a (poly)carbodiimide as recited in the instant claims (claims 1, 2, 3, 7, 12).

19. Regarding the formation of an "island phase" having a specific diameter, the examiner notes that applicant recites in ¶0071 that said island phase forms due to a reaction between the carbodiimide compound and the polar group-containing polymer, resulting in cross-linking. The examiner takes the position that one of ordinary skill would reasonably expect that a fraction of the (poly)carbodiimide in the composition of Sakai would react with the polyethylene terephthalate, resulting in cross-linking of the polyester and the formation of an "island phase" having properties similar to those of the composition of the instant claims (claim 13).

20. Regarding the IZOD value of the composition, the examiner notes that, the composition of Sakai is prepared using a polar group-containing polymer, an acid-modified polyolefin, and a (poly)carbodiimide compound. As the composition of Sakai is prepared from similar components to those recited in the instant claims, the examiner takes the position that one of ordinary skill in the art would reasonably expect the composition of Sakai to have similar properties of IZOD strength compared to the composition of the instant claims (claim 12).

21. MPEP § 2112 recites that "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or

Art Unit: 1796

her] claimed product. Whether the rejection is based on inherency under 35 U.S.C. 102, on *prima facie* obviousness under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same..." as that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980). As discussed in MPEP § 2113, once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). The burden is therefore shifted to the applicant to prove that the properties used to define the modifier/resin composition of the instant application would not be present in the polymer composition disclosed by Sakai.

22. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama et al, US4707512, in view of Sinclair, US5216050.

23. Maruyama does not disclose the use of a polylactic acid as the polyester of the compositions of US4707512.

24. Sinclair teaches environmentally degradable compositions comprising a blend of polylactic acid and a polymer such as polyethylene terephthalate (Column 2, lines 48-55), in which the weight ratio of the polylactic acid to the polymer is within the range from 99:1 to 1:99 (Column 11, lines 5-8). Sinclair teaches that the compositions of

Art Unit: 1796

US5216050 are useful in that they can possess the characteristics of conventional plastics for manufacturing, yet degrade in the environment (Column 11, lines 19-29).

25. Maruyama discloses the use of polyethylene terephthalate in the production of the compositions of US4707512 which may be used in the production of articles. The examiner therefore takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the composition of Maruyama by blending a polylactic acid with the polyethylene terephthalate component, as taught by Sinclair, to produce a more environmentally-friendly polymer composition.

26. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al, JP 2003268215, in view of Sinclair, US5216050.

27. Sakai does not disclose the use of a polylactic acid as the polyester of the compositions of US4707512.

28. Sinclair teaches environmentally degradable compositions comprising a blend of polylactic acid and a polymer such as polyethylene terephthalate (Column 2, lines 48-55), in which the weight ratio of the polylactic acid to the polymer is within the range from 99:1 to 1:99 (Column 11, lines 5-8). Sinclair teaches that the compositions of US5216050 are useful in that they can possess the characteristics of conventional plastics for manufacturing, yet degrade in the environment (Column 11, lines 19-29).

29. Sakai discloses the use of polyethylene terephthalate in the production of the compositions of JP2003268215. The examiner therefore takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made

to modify the composition of Sakai by blending a polylactic acid with the polyethylene terephthalate component, as taught by Sinclair, to produce a more environmentally-friendly polymer composition.

30. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama et al, US4707512.

31. The instant claim recites a method for producing a resin composition comprising kneading and mixing a functionalized polyolefin and a carbodiimide-group containing compound, and further kneading and mixing the obtained product with a polar group-containing polymer.

32. Example 13 of Maruyama discloses a process of producing a resin composition comprising the steps of blending polybutylene terephthalate with an ethylene/1-butene copolymer grafted with maleic anhydride and tetrahydrofurfuryl methacrylate. The product obtained from this step is then blended with bis(dipropylphenyl)carbodiimide to yield the polymer composition. Maruyama therefore teaches a process of mixing the polar group-containing polymer with the functionalized polyolefin, followed by the addition of the carbodiimide compound. Maruyama fails to teach a process of first mixing the functionalized polyolefin with the carbodiimide, followed by mixing with the polar group-containing polymer.

33. MPEP § 2144.04 [R-6] states that "Selection of any order of mixing ingredients is *prima facie* obvious." (*In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930)) The examiner therefore takes the position that it would have been obvious to one of ordinary

Art Unit: 1796

skill in the art at the time the invention was made to modify the process described in Maruyama by first mixing the ethylene/1-butene graft copolymer with the carbodiimide compound.

Conclusion

34. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Han et al, US4689372, teaches the reaction of acid-functionalized polyphenylene ether copolymer with carbodiimide compounds to form a compound useful as a compatibilizer in blends of polyphenylene ethers and polyesters.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Lenihan whose telephone number is (571)270-5452. The examiner can normally be reached on Monday through Thursday from 7:30-5:00 PM, and on alternate Fridays from 7:30-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James J. Seidleck can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1796

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/
Supervisory Patent Examiner, Art Unit 1796

Jeffrey Lenihan
Examiner
Art Unit 1796

/JL/